
PRESTO Update – NE DOLWG Aug 16

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Background

- NASA's Space Launch System (SLS) is using vertically complete atmospheric measurements in vehicle design analyses and day-of-launch (DOL) operations support
 - Designing the vehicle using wind energy spectral content not dependent on instrumentation source
 - Using measured winds as input for DOL vehicle trajectory and loads assessments
 - Allows for multiple data sources to be used in DOL assessments
- The United States Air Force Eastern Range (ER) at Cape Canaveral Air Force Station provides atmospheric data through network of weather balloons and Doppler Radar Wind Profiler (DRWP) instruments.
 - Automated Meteorological Profiling Systems (AMPS)
 - Low Resolution Flight Element (LRFE)
 - High Resolution Flight Element (LRFE)
 - Jimsphere
 - Tropospheric DRWP – NASA owned
 - 915 MHz DRWP
- MSFC Natural Environments (NE) branch is developing software (Profile Envision and Splice Tool (PRESTO)) to produce vertically complete profiles from available sources

Project Progress

- PRESTO development requires compliance with NASA Software Engineering Requirements (NPR 7150.2B) standard
 - Project documentation
 - Approved
 - Software Development Plan
 - Software Requirements Specification (SRS)
 - Software Design Document
 - Software Test Plan
 - Planned
 - Software Version Description
 - Software User Manual
 - Software Maintenance Plan
 - Technical reviews
 - Software Design Review – 5/16
 - Test Readiness Review – 10/16
 - Acceptance Review – 5/17
 - Test cycles
 - Unit Testing – currently underway
 - Acceptance Testing – 11/16
 - SLS Operations Center Integration Testing – 1/17
 - End-to-End Testing – 4/17
- Anticipated completion date – May 2017

Software Verification & Validation

- Verification will show PRESTO compliance to the software requirements defined in SRS
 - Accomplished through test cases mapped against a verification compliance matrix to ensure complete test coverage
 - Unit testing to check for completeness
 - Acceptance testing “official set” of tests
- Validation will assess the spliced and filtered wind data output produced from PRESTO against output from another source code
 - NE has separate source code with the same algorithms used to generate DRWP spliced databases for SLS vehicle design analyses

PRESTO Input

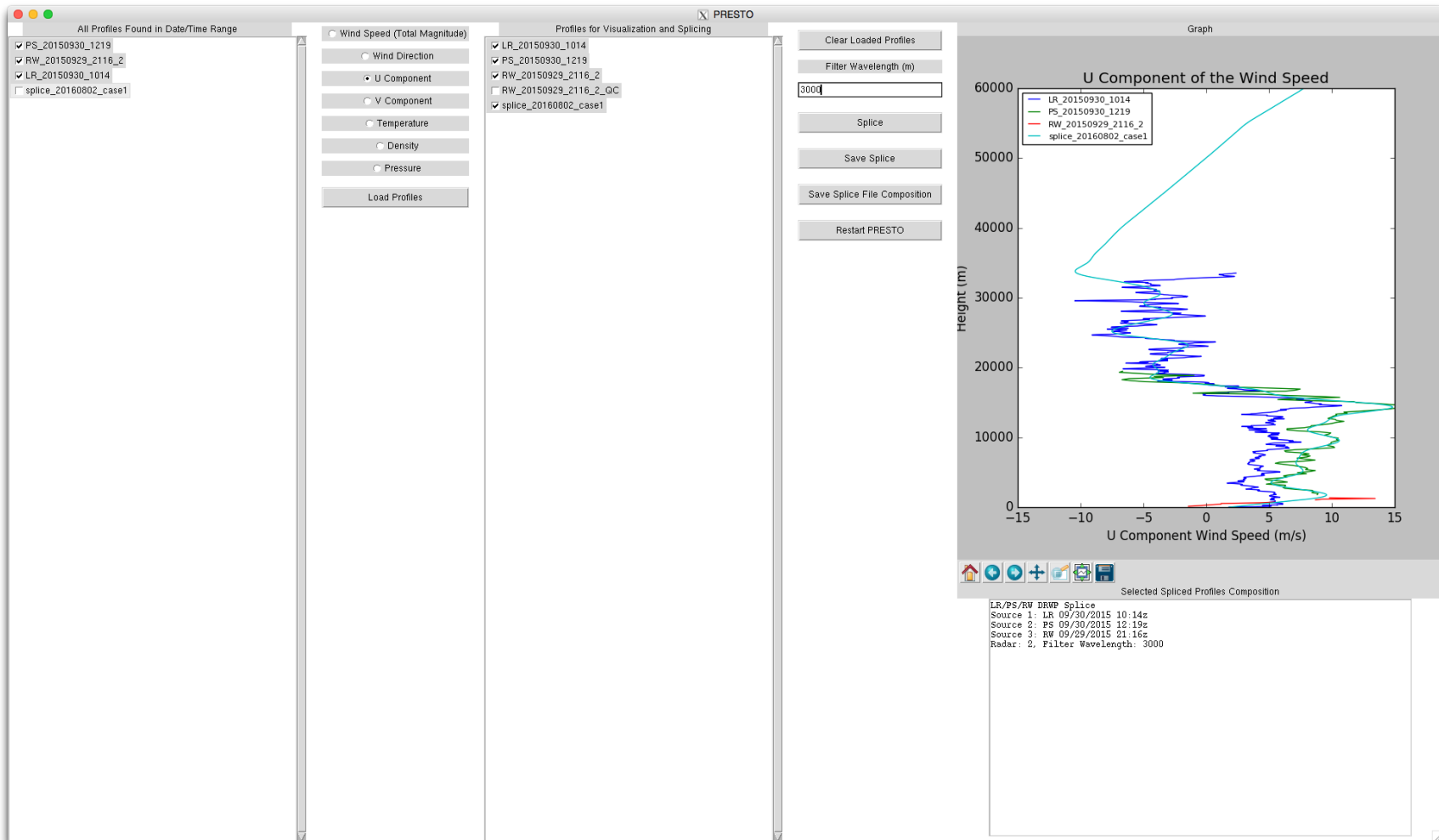


A screenshot of a macOS-style dialog box titled "PRESTO". The dialog has a title bar with red, yellow, and green window control buttons. Below the title bar, the text "Please enter starting and ending Year, Date, and Time" is displayed. The main area contains a list of input fields on the left and corresponding buttons on the right. The input fields are: "Data Directory", "Splice Directory", "Deliverable Directory", "GRAM file Directory", "Beginning Year", "Beginning Month", "Beginning Day", "Beginning Time (Zulu)", "Ending Year", "Ending Month", "Ending Day", and "Ending Time (Zulu)". The buttons on the right are: "Get Data Directory", "Get Splice Directory", "Get Deliverable Directory", and "Get GRAM File path". At the bottom left is a "Search" button, and at the bottom right is a "Cancel" button.

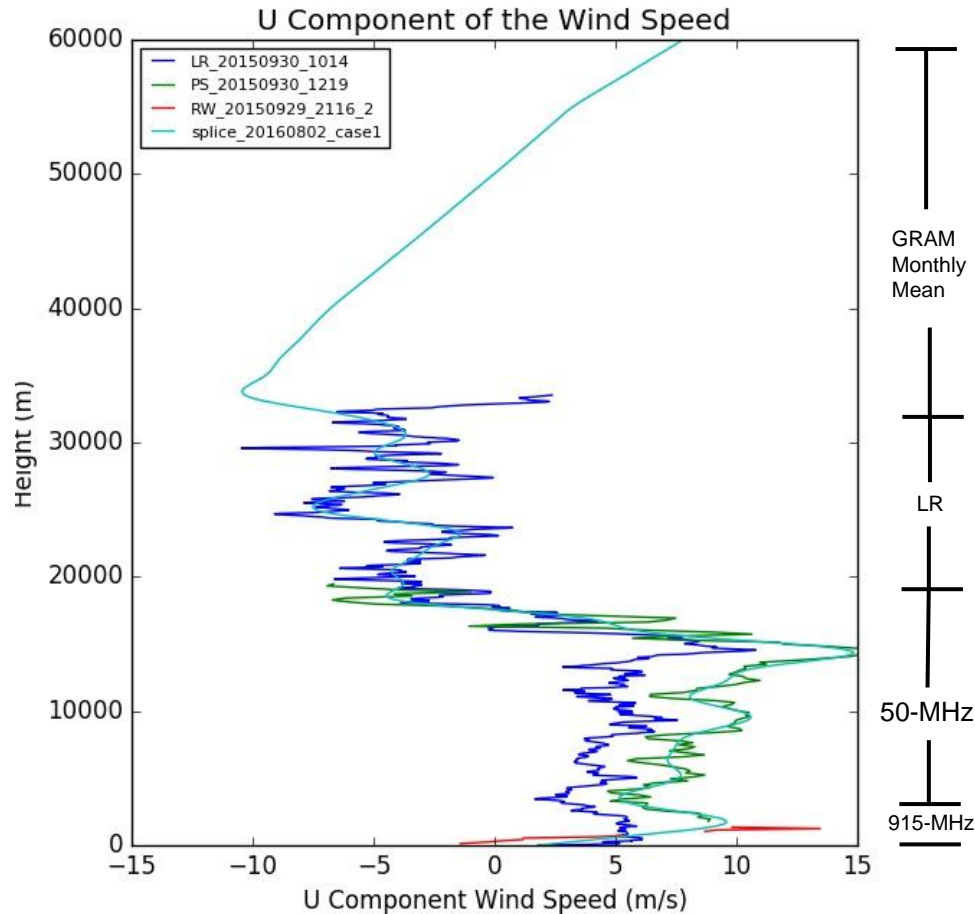
| Field Label | Field Type | Action Button |
|-----------------------|------------|---------------------------|
| Data Directory | Text Input | Get Data Directory |
| Splice Directory | Text Input | Get Splice Directory |
| Deliverable Directory | Text Input | Get Deliverable Directory |
| GRAM file Directory | Text Input | Get GRAM File path |
| Beginning Year | Text Input | |
| Beginning Month | Text Input | |
| Beginning Day | Text Input | |
| Beginning Time (Zulu) | Text Input | |
| Ending Year | Text Input | |
| Ending Month | Text Input | |
| Ending Day | Text Input | |
| Ending Time (Zulu) | Text Input | |

Search Cancel

PRESTO Main



PRESTO Input/Output Example

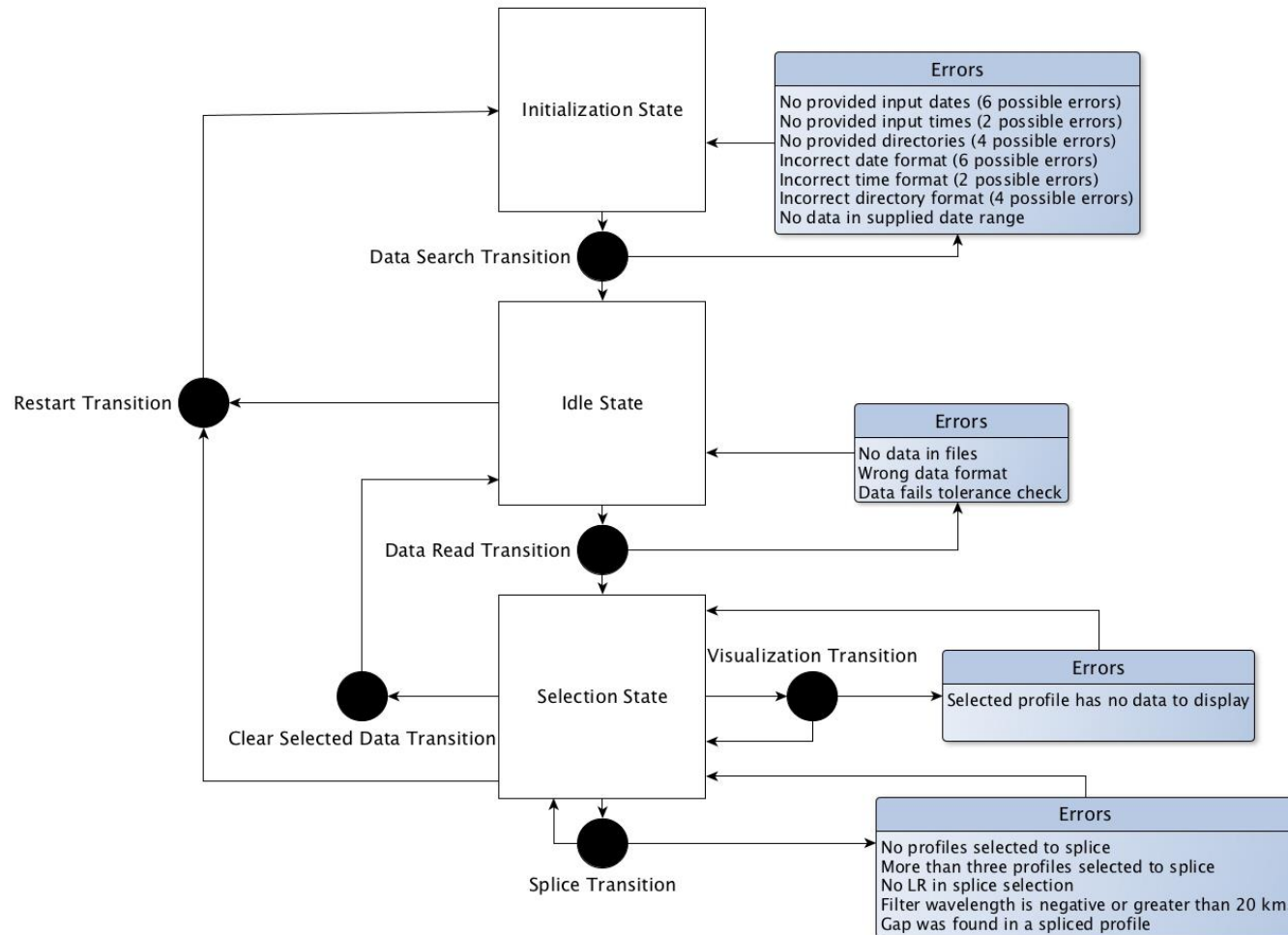


Spliced Profile Sources:

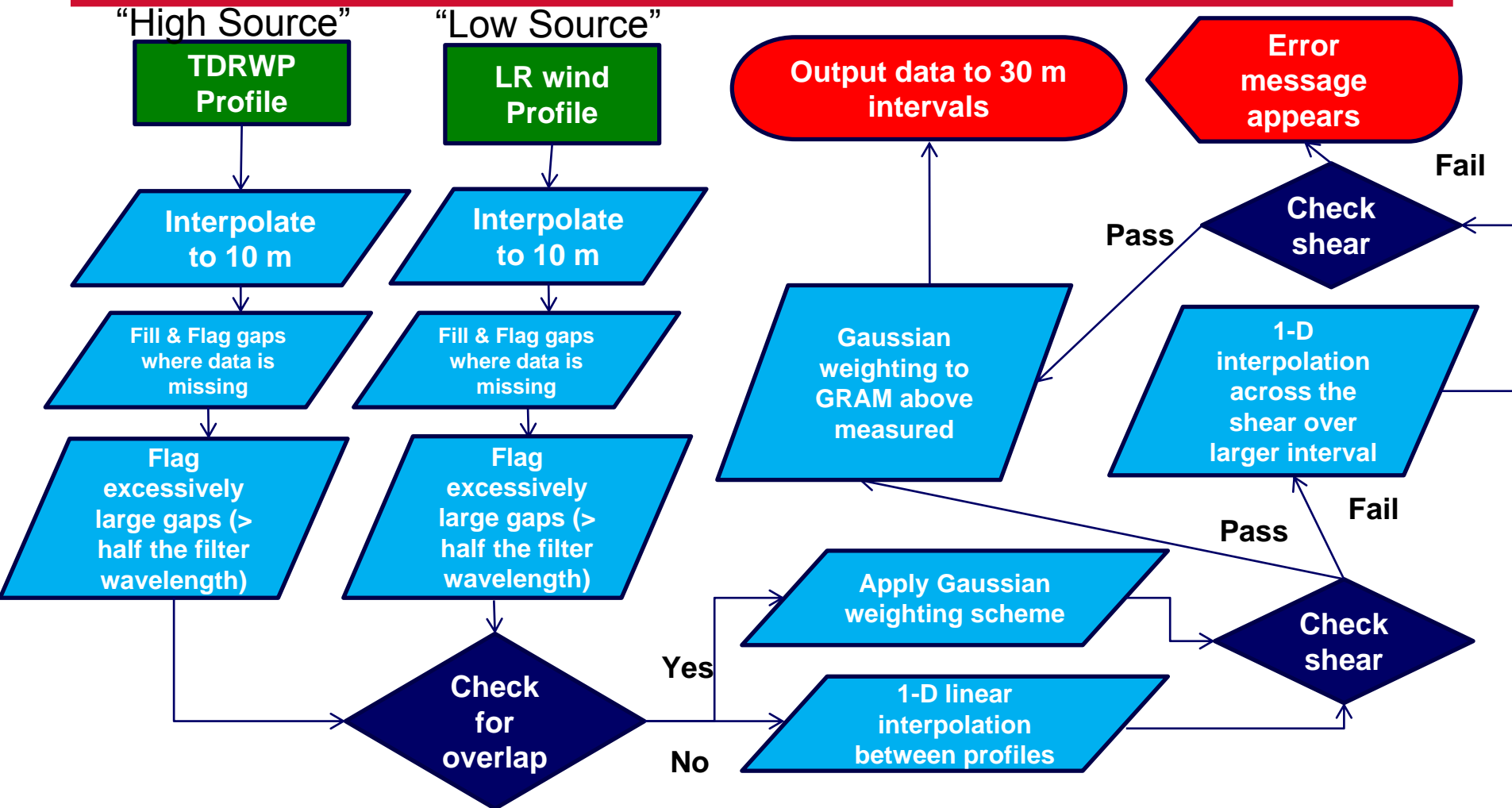
- KSC Range Reference Atmosphere Monthly Mean Data output from Earth Global Reference Atmosphere Model (GRAM)
- Automated Meteorological Profiling System (AMPS) Low-Resolution (LR) Balloon
- 50-Mhz Doppler Radar Wind Profiler (DRWP)
- 915-Mhz DRWP

BACKUP

PRESTO State Diagram



PRESTO Splicing Flowchart



Modified from Barbré, Jr., R. E., "Characteristics of the Spliced KSC Doppler Radar Wind Profiler Database". Presentation to the Natural Environments Day-of-Launch Working Group, 14 August 2013.